DANISH FOREIGN OFFICE JOURNAL

NUMBER 26

1958

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COMMERCIAL & GENERAL REVIEW

PORTRAIT OF A PRINCESS

Princess Margrethe, heir to the Danish throne since the introduction of female succession under the constitutional amendment of 1953, will celebrate her eighteenth birthday on April 16, 1958. She will then become of age and will sit with the King in Council, with the prerogative of presiding over the Council of Ministers in the King's absence. By Susanne Palsbo.... *page 15*

THE MODERN TRADITION IN DANISH FURNITURE

Behind the artistic and technical achievement which has earned for Danish furniture design its prestige lie many years of hard work, self-denial, and vision in cabinet-makers, and artistic ability and self-discipline in designers. There is occasion to take stock of this contemporary tradition, for — says the author — a new trend of development has been initiated. By Arne Karlsen..... *page 20*

SIDELIGHTS ON DENMARK..... *page 24*

BARROW INTO CAR

Half of all the blind persons in Denmark have exchanged their board and pin for a Danish Braille typewriter, which is a remarkably efficient and inexpensive machine. Given reasonable practice, it can be operated at the speed of normal writing with pen and ink. By Kristen Hesselager..... *page 25*

COSY LITTLE MUSEUMS

The charm of Copenhagen as a museum city has other reasons besides its many great collections of international renown, such as the National Museum, the Arms Museum, and the Glyptothek. There are also a number of small and little known museums. Each of these contains unique rarities within its special field, and their often rather modest scope gives to each an intimate grace and an atmosphere of good old-fashioned Danish cosiness. Drawings by Mogens Fønss ..... *page 26*

A JEWEL AMONG ORGANS

One of the precious instruments of musical history, the 350-year-old Compenius organ, is still used in the Palace Chapel at Frederiksborg, north of Copenhagen, in a setting rich in national historical associations. Master players come from far and near in order to play this organ. The high reputation of modern Danish organ-builders cannot be unconnected with the inspiration of Compenius. By Hans Carl Nielsen..... *page 28*

BOOK SHELF..... *page 30*

PEARL OF THE BALTIC

Historical ups and downs, together with unswerving loyalty to Denmark down the centuries, have characterized the island of Bornholm. The mild climate gives it an individuality that is paralleled by the character of its people and scenery. Occupations, which are closely associated with the island's structure and situation, are picturesque also, with stoneware and herring smoking outstanding among them. By Hans Hjorth..... *page 31*

QUALITY REFLECTS METHOD

From cellars and attics in the infancy of radio the Danish radio industry has advanced to modern factories employing 30,000 people. Through a sub-contracting system and consequent specialization the products of the industry have reached a technically outstanding quality in the most diverse lines. By K. Henning Pedersen..... *page 35*

NEW HORSEPOWER FOR OLD

The rapid changeover from horses to tractors since the war has naturally given agricultural Denmark her own tractor production. Of sophisticated simplicity, sturdy construction, and surprising performance, the Danish tractor is now at work under widely different conditions. By Victor Andersen..... *page 37*

On the first cover the monogram, which H. R. H. Princess Margrethe as heir to the Danish throne will adopt on her eighteenth birthday this month. The monogram, which was created by the Government Heraldic Adviser, Mr. Paul V. Warming, in collaboration with the architect, Mr. Claus Achton Friis, is in three versions, showing different details of design

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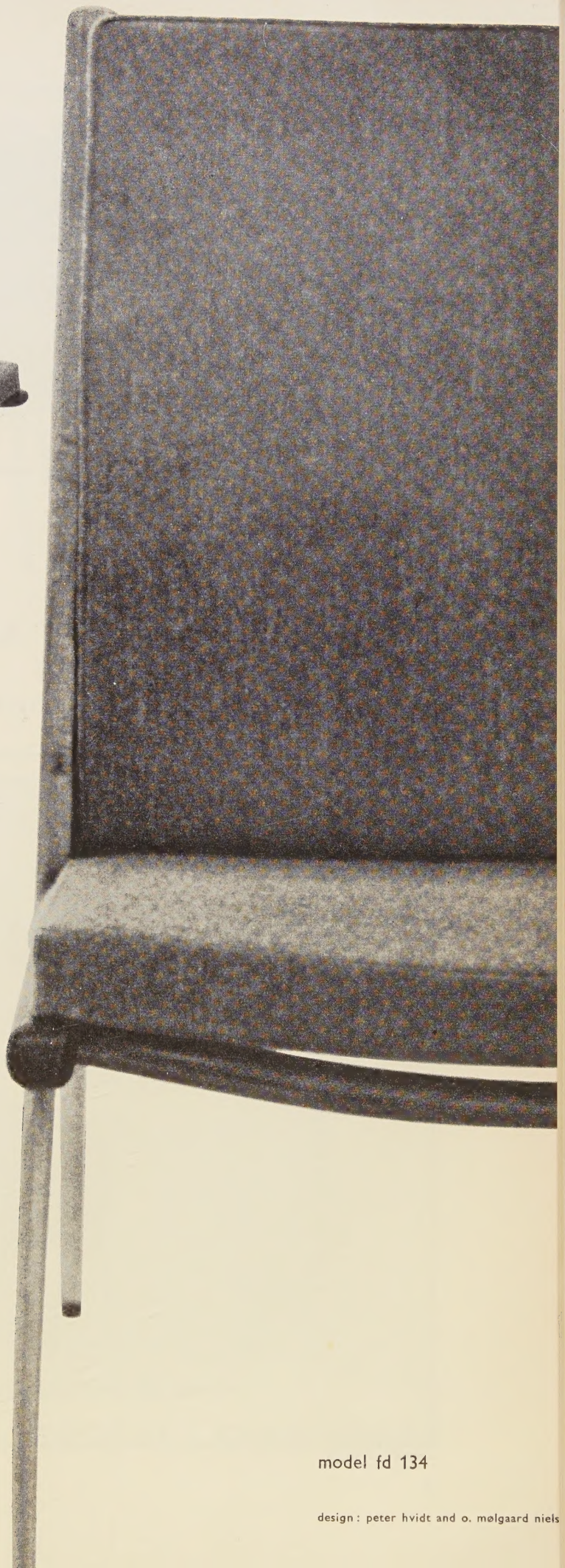

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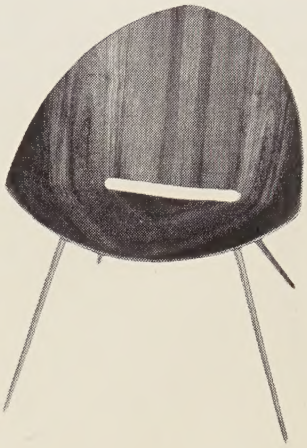

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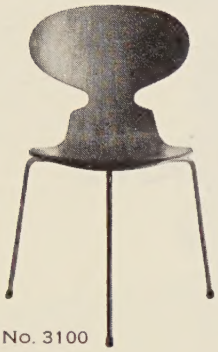

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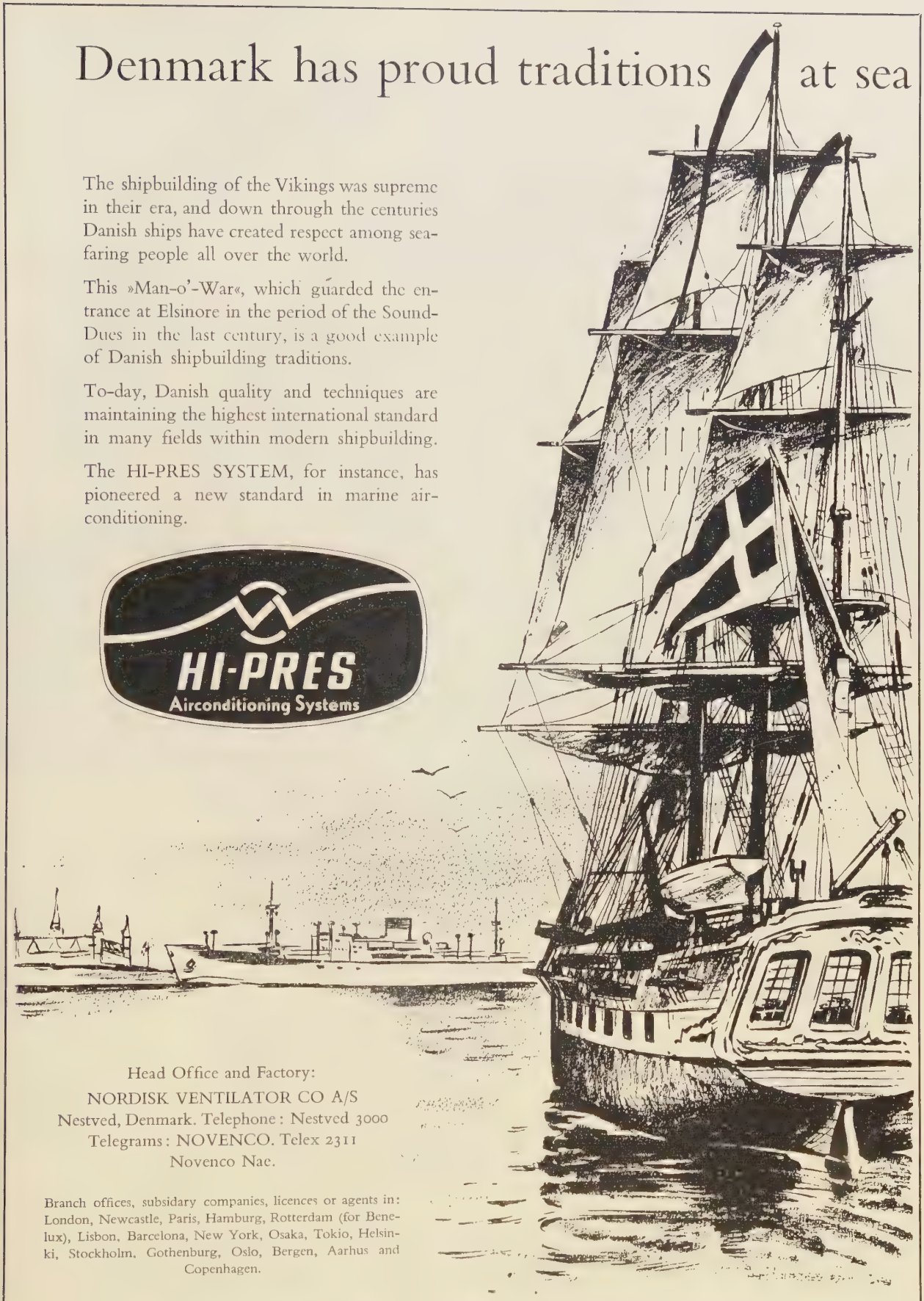

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DANISH FOREIGN OFFICE JOURNAL
NUMBER 26 . APRIL 1958

Portrait of a Princess

By Susanne Palsbo

Princess Margrethe, heir to the Danish throne since the introduction of female succession under the constitutional amendment of 1953, will celebrate her eighteenth birthday on April 16, 1958. She will then become of age and will sit with the King in Council, with the prerogative of presiding over the Council of Ministers in the King's absence

In 1953, when the right of female succession was introduced under a referendum for a new Constitution, the King's eldest daughter, Princess Margrethe, was a young schoolgirl, but already she held a warm place in the affections of the Danish people. Her first real public appearance was during the state visit to Denmark of Queen Elizabeth in 1956, and it was plain to see then that she had developed into a charming girl who filled her role in the brilliant scene with perfect grace.

Princess Margrethe was born in the fateful year 1940, exactly a week after the Nazi occupation. When her birth was publicly announced, the flags were hoisted all over the country for the first time since that black day on the ninth of April, as if the nation were seizing the opportunity to demonstrate in the face of everything its faith in the future and its resolve to rally round the royal house, in the way it has done for more than a thousand years.

In Princess Margrethe's early years her father was Crown Prince and already her parents had their home in the palace of Frederik VIII at Amalienborg which is now the royal residence. King Frederik succeeded to the throne on the death of his father, Christian X, in April 1947.

The young princess naturally aroused the intense interest of every Dane from the day she was born, but her parents were at pains to impress upon everyone their wish that she should be allowed to grow up in as much privacy as possible. They wanted her to have, in every respect, the life of an ordinary little girl, and their wishes were understood and respected.

As her parents believed that it would be valuable if she were to learn to associate on an equal footing with other children, a small nursery school was started at Amalienborg Palace for a group of boys and girls of her age, and when she reached normal school age a school class for seven girls was opened at the palace. The lessons, given by Miss Marie Elisabeth Barfod, were based on the curriculum of Zahle's School in Copenhagen, to which all seven were entered as from the fourth year.

The classroom of Amalienborg School, on the second floor of the palace, was equipped with bars for gymnastics and had a grand piano in the corner on which the teacher could play while the children sang. Lessons included frequent visits to museums and the zoological gardens. Miss Barfod, who is a specially trained instructress in swimming and phy-

Royalty only attend meetings of Parliament as part of their education. Here Princess Margrethe is in the diplomatic gallery with Countess Armfelt. The Premier, Mr. H. C. Hansen, is welcoming her. The picture was taken from the press gallery opposite

With workers as only escort the Royal Family are on the way to the shipyard at Elsinore to name a fine liner "Prinsesse Margrethe"

sical education, also took her class to the swimming baths at the State Institute of Physical Training, where the princess soon became an excellent swimmer and a talented diver.

In 1949 the school at Amalienborg came to an end and Princess Margrethe and her six companions were transferred to the fourth-year class at Zahle's School, where, at the same time, the elder of her two sisters, Princess Benedikte, began in the first class.

The two sisters slipped easily into the general scheme of the school without any privileges of rank. In good weather they invariably walked to school with their mother or their governess, and during the break they ate their sandwiches with their schoolmates under the large chestnut-trees in the school yard. In the summer, when the family lived at Fredensborg Palace in the north of Zealand, they naturally drove in one of the royal cars, but they would always get out half a mile from school and walk the rest of the way. Princess Margrethe was happiest when not making any more stir than was necessary.

Cottage and Royal Yacht

Besides the palaces of Amalienborg and Fredensborg, the King and Queen own a delightful palace at Graasten in South Jutland, and also a charming shooting-lodge at Trend in North Jutland.

In the park at Graasten the three princesses have a little house of their own, a thatched cottage with hollyhocks growing in front, and here they are able to invite guests, whom they cook for in the diminutive blue-painted kitchen. The shooting-lodge at Trend is the place where the royal family like to be all on their own. The building stands in the midst of a plantation closed to strangers; and it is here that the royal family always spend Christmas and Easter. Incidentally, King Frederik has yet another summer residence, of which his eldest daughter is particularly fond: the royal yacht *Dannebrog*, with whose layout and functions she is familiar in every detail, and which she loves to be aboard during the summer cruises along the Danish coasts. Like her father she is an excellent sailor, and she thoroughly enjoys herself when the yacht suddenly casts anchor off some tiny island and the entire royal family land unannounced and set the island community agog with excitement and pleasure.

Artist and Amateur Actress

From her earliest years Princess Margrethe has shown many talents and interests. She is good at drawing and nearly always has her sketching-pad ready when the *Dannebrog* puts in at some strange place; and then in a few deft strokes she will recapture a landscape or other scene rapidly on paper. She is also an entertaining amateur actress. The three princesses have always enjoyed acting in shows which they have put on for the family and friends. On one occasion they took on the exacting task of performing Barrie's comedy-thriller *Shall We Join the Ladies?*, the heir to the throne playing the part of the neurotic young lady Mrs. Prees. One thing she has almost always refused to do, and that is to take the part of a princess. The fun of play-acting is in being someone different from one's everyday self!

She is deeply interested also in archaeology, and has taken part in many of the excavations carried out in various parts of the country by the National Museum. In

FUN: From a party at the Naval College; the Princess and the cadet (the 21-year-old Jens Grønbech)

WORK: Princess Margrethe studying her lessons in her room at the Amalienborg palace

AT HOME: The Royal Family gathered for afternoon tea at Amalienborg; King Frederik, Princess Benedikte (b. 1944), Princess Anne-Marie (b. 1946), Queen Ingrid and Princess Margrethe

Italy, where she participated as a guest in the excavation of an Etruscan cemetery near Rome, she had the experience of finding the only small piece of gold discovered on the site. On that occasion she worked alongside her grandfather, King Gustaf VI Adolf of Sweden, himself an outstanding amateur archaeologist, who at every opportunity encourages his granddaughter's interests in this field.

In Sweater and Jeans

Throughout her childhood Princess Margrethe had dreamt of experiencing life at a typical English boarding school, and in 1955 her dream came true. She was entered for a year at the small, exclusive school of North Foreland Lodge at Buckfield House, the fine country seat of Lord Winchelsea near Basingstoke. Here she spent a happy year as an English schoolgirl, wearing the school's green uniform and with three white blouses, two white sweaters, and a pair of blue jeans and a riding whip as the only other outfit. She shared a room with two or three British companions, took turns with them in looking after their room during the first term, and with them supervised during the last term a small group of the school's youngest pupils.

She spoke almost faultless English from the day of her arrival, having for several years had an admirable English governess in Miss Mary North, while a French governess, Mademoiselle de Long Villiers, had perfected the princesses' French accent.

Straight to the Point

When Princess Margrethe returned from England in the late summer of 1956 a private grammar school was established at Amalienborg, where the heir to the throne will sit for her general certificate next summer. During the first year and a half she was the only student, but she has recently been joined by a daughter of a friend of the Queen.

Princess Margrethe is an extremely conscientious and hard-working pupil, and it would be a mistake to imagine that she will get her matriculation more easily than others of her year. Nor would she care to do. Her industry, her quick-wittedness, and her delight in asking questions—and going straight to the point—have already given her an exceptional knowledge in the most varied fields. She has a good collection of books, and it is evident from their appearance that they are more than mere decoration.

From the Album of Countess Kitty Armfelt

In her spare time she goes in for many kinds of sport. In summer she swims; in the winter she fences, plays tennis, goes for a weekly ride, and runs with her lady-in-waiting, Countess Kitty Wava Armfelt. Driving to some peaceful wood in the vicinity of Copenhagen, they will leave the car and go for a quick three-mile run. The princess says that this is fine exercise and gives one a lot of fresh air—which is what one needs after a day at books and exercises.

Princess Margrethe is now a tall, slim young woman with her mother's presence and charm. She is ash-blond, her eyes blue and clear, and her complexion fair. She has fine, expressive hands, and when amused, as she often is, she will throw back her head in peals of laughter.

In the four *soirées* given by the King and Queen at the beginning of the year she took part officially for the first time, strolling about the brilliantly illuminated and festively decorated salons and conversing easily with guests of all ranks and walks of life.

Warmth of Personality

The princess's coming of age on the sixteenth of April, which outwardly may seem very important, will not involve great changes in her daily life. She is busy with her studies, and her sensible parents will allow her to go on concentrating on them. This is what she herself wants, for, as she says: "Luckily, I am still an ordinary Danish girl."

To the two younger princesses she is an adored elder sister; in childhood always the one who started the game with a vivid imagination which carried them all away, and later the good and helpful companion who, if occasionally she could tease, was always ready to defend or comfort them in trouble. Her helpfulness and generosity are remarkable, and her humour seems irrepressible even when things go wrong. And although the general public do not often have the opportunity yet of seeing her, her popularity is steadily rising and she is warmly welcomed wherever she appears. On her birthday, there is no doubt that she will discover to the full how much of the devotion felt by the Danish people for her parents has already been transmitted to her. Those who know her can testify in all confidence that she fully deserves it.

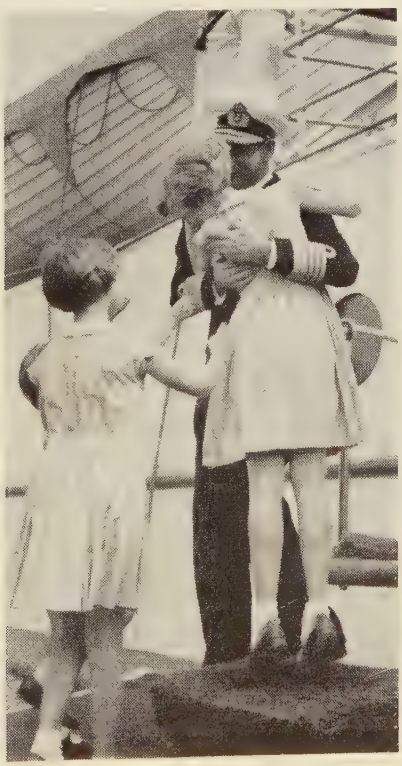
A quiet music lesson with Father (See the article "Monarch and Musician", DFOJ 7/1953)

"Mother, will you take my coat..." (From a riding lesson at Fredensborg palace, North Seeland)

A Happy Childhood the Best Foundation

A suitor for the fair Princess (A children's party at the Swedish Embassy in Copenhagen)

"Me first!" (King Frederik usually sails, while the Queen and the princesses go by train or car)



"I say, isn't this fun!" (Enthusiastic spectator at the Copenhagen Swimming Baths)

Display by Kaare Klint at the Danish Museum of Decorative Art. The furniture, which was made about 1930, is in mahogany. The bookcase is designed on the basis of Klint's theoretical work on standardized paper sizes

The Modern Tradition in Danish Furniture

By Arne Karlsen

Member of The Federation of Danish Architects

Behind the artistic and technical achievement which has earned for Danish furniture design its prestige lie many years of hard work, self-denial, and vision in cabinet-makers, and artistic ability and self-discipline in designers. There is occasion to take stock of this contemporary tradition, for – says the author – a new trend of development has been initiated

A visiting craftsman whom I recently conducted on a tour of Copenhagen furniture shops expressed surprise that I was able to identify the various designers. In spite of a wide knowledge of Danish applied art, he could not detect the difference between individual styles. But he was sure he could recognize Danish furniture wherever he might meet it. Danish furniture, to him, was artistically one, a collective idea.

It is a striking thought that an urge for originality in idiom, so often cultivated, should be blurred to the distant observer. The characteristically Danish element, as he sees it, is the homogeniety—on the artistic and the productive side.

The origins of this feature can be seen in the history of Danish furniture design over the last thirty years. Earlier in the century only isolated attempts were made to produce work of the consistently high artistic and technical quality seen today, and which in the last decade has caused the international public to equate the word "Danish" with "quality", in furniture.

Seeking a Policy

In the 1920s the need was felt, in Denmark and other countries, to get away from insipid period imitations as well as from attempts to create a new "style". Variously formulated, the movement had a common aim: to find a clear and valid policy with a sustaining thought content, The simple object was functionalism. which requires that things shall be designed for fitness of production and purpose.

The Cabinet-makers' Guild of Copenhagen was involved in this movement as a matter of course. A crisis in the trade, due to lack of purchasing power and growing competition from factories, forced cabinet-makers into a policy of educating the public to an awareness of the values inherent in the fine old craftsmanship which had survived the period of stylistic confusion and "arty-crafty". The means employed were annual exhi-

bitions, which were associated with competitions open to designers. The first of these exhibitions took place in 1927, and they have been held regularly ever since, in spite of foreign occupation and fluctuating economic conditions. Copenhagen master cabinet-makers are a stubborn race: individually self-respecting and respectable and at the same time doggedly determined to survive as a class.

Educational Success

To begin with, the exhibitions were no more than sales displays, but soon a policy with an educational slant was developed. The criticisms of period imitations made by progressive art critics and designers were acted upon, the services of idealistic young designers were enlisted, and before very long the aims had been formulated, as in the opening speech by Mr. A. J. Iversen, himself a master cabinet-maker: "The policy of Copenhagen master cabinet-makers is to make furniture which, clear in form and free from exaggerations, will long survive changing fashions and in so doing be a delight and comfort to their owners for years to come."

Cabinet-makers have pursued this aim ever since.

It is paradoxical that it should thus have been cabinet-makers and their designers, and not furniture manufacturers, who took up the task of producing simply designed furniture for small modern homes. It is not surprising that their products were too expensive for many pockets; but as time went on, the exhibitions arranged by the cabinet-makers were so educationally successful that they influenced the development of a progressive furniture industry with a policy similar to their own. The cabinet-makers had promoted a change in public taste which enabled large-scale production of functionalistic furniture to be undertaken with profit.

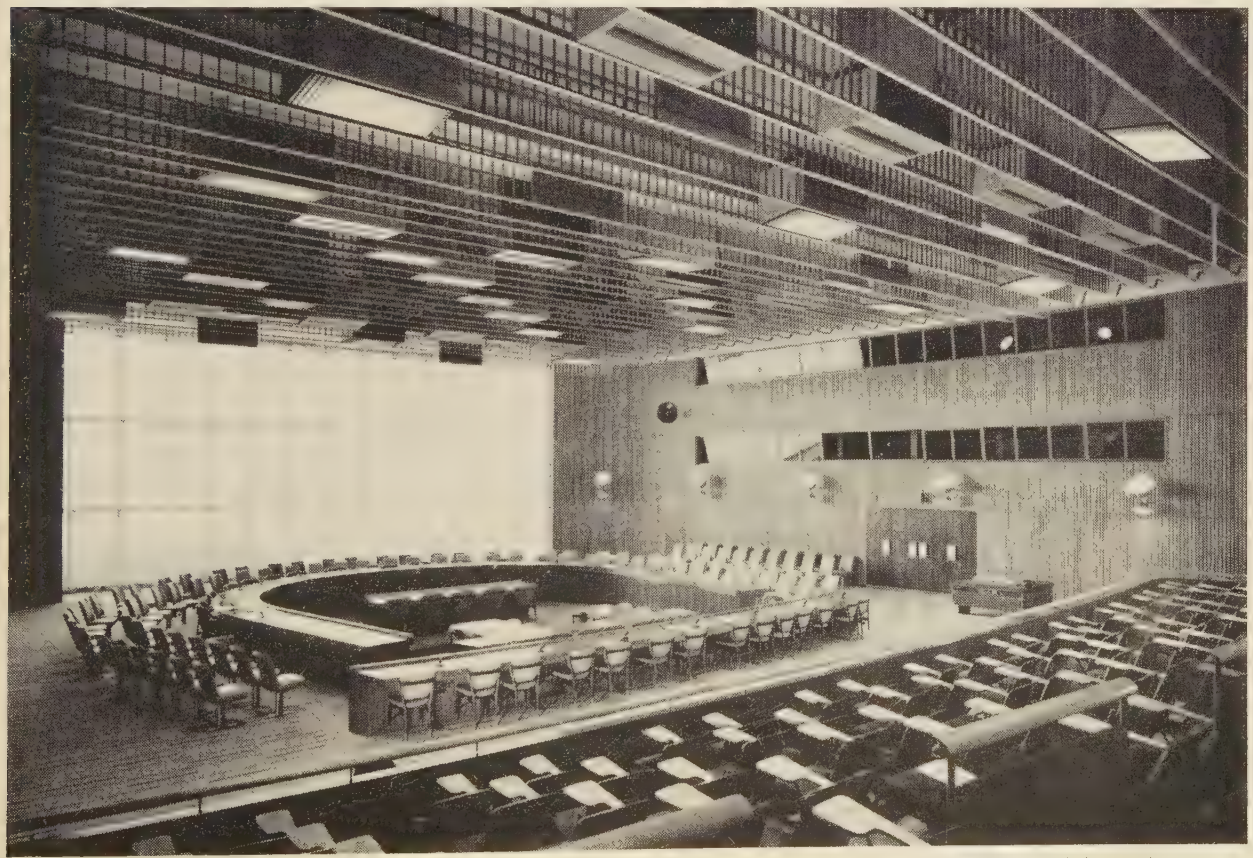
A Common Background

There are many outstanding designers of contemporary Danish furniture. It is to the credit of the cabinet-makers that they have encouraged them and enabled their ideas to pass, as it were, from the drawing-board into the drawing-room, from conception to realization. But the homogeniety of Danish furniture design is due also to the common background of the bulk of our best designers: the furniture school of the Royal Academy of Fine Arts in Copenhagen. Here one man created the universal theoretical foundation on which all contemporary Danish furniture design rests. That man was the late Professor Kaare Klint.

Klint was no propagandist; he rarely lectured, and he wrote still less. Consequently, he has not gone down in history as one of the founders of the functionalist movement. But from the day on which the school was opened in 1924 it was functionalism that he taught. The view of furniture designing which he developed through his works and through his teaching is today the common heritage, conscious or unconscious, of every young Danish furniture designer.

Stringency and Economy

Kaare Klint created the contemporary Danish tradition by the simple means of teaching his pupils a stringent method of work based on knowledge of the materials and close studies of the functions and purposes of furniture form in relation to human dimensions and requirements. With his peculiarly developed sense of spatial economy he worked out a simple mathematical system which found expression in his own production in finely dimensioned and compact stacking furniture. At a very early date (1916) he tabulated the dimensions of furniture types in which form is dependent upon sheets of paper: that is to say, desks, bookcases and shelves, filing cabinets, etc. Standardization was carried from paper to three-dimensional objects. A start was



The hall of the Trusteeship Council at UN's headquarters in New York (1952). Architect: Finn Juhl; cabinet work by Jacob Petersen.

Living-room in teak and oak by Børge Mogensen. Cabinet-makers' Guild's exhibition, 1956. The types have since gone into serial production

made with some simple experiments in the storage of everyday articles in cupboards in the light of normal family requirements. Assisted by his pupils, Klint measured a wide range af plates, cups and saucers, jugs, knives, forks, spoons, and every other form of tableware, and he also studied economical ways of folding the table linen. All this led him to a few basic dimensions in shelves and drawers and in the design of bulk furniture. His service cupboards, his bookshelves, and his worktables made up from component parts are fine cabinet-making yet, in their whole idea and expression, are admirable prototypes for industrial production. They are worked out as *types*, and not as isolated specimens.

Klint himself never went in for industrial production (though he thought of doing so as early as 1918), but it is indicative of the general trend that some of his pupils and closest associates now dominate the bulk of the day-to-day production of good everyday furniture. Børge Mogensen's stacking furniture, with its wide range of uses and combinations, carries on most clearly Klint's method and ideal. Hans J. Wegner's serial furniture and Mogens Koch's sectional bookshelves spring from them.

Kaare Klint found a response to his own view that function should determine aesthetic form in the design of seventeenth-century English furniture and a study of this period influenced some of his own furniture and that of many of his pupils. But with his own ready response to the promptings of his art he also found other inspiration in old furniture. He could see nothing that was dishonest or degrading in learning from the experience of others as regards either function or form, and wished to develop the forgotten knowledge of earlier days where this had resulted from the study of problems similar to ours, and provided that the particular technical conditions remained unchanged. Accordingly, he elaborated a number of well-known patterns: timeless types from various periods and many countries, all having the common feature of simple construction combined with an immediately apparent, practical purpose. By way of types such as the safari chair, the deck-chair, and the chair in the Grundtvig Church (the "organ church") in Copenhagen he laid the foundation for our contemporary view of furniture as unpretentious tools which should be good to use.

In this class of furniture Klint's own products—even the most austere ones—were also cabinet-made. But the highly simplified scheme of construction gave a good basis for the start of rationalized factory production of inexpensive everyday furniture. Børge Mogensen and Hans J. Wegner in particular have continued this policy and created characteristic patterns that have formed types: robust furniture which stands up to daily wear, and which, in its lightness and small dimensions, is well adapted to contemporary home habits, influenced by the terms imposed by the small dwelling.

The contrast to Kaare Klint in the realm of contemporary Danish furniture is Finn Juhl. Even in so brief a survey as this it would be wrong to disregard this highly individualistic designer, who stands deliberately outside the group but who has nevertheless, through the distinctive

character of his production, been an inspiring influence on many younger designers. Perhaps the best recent Danish furniture design has been generated by the opposing impulses which have gone out from the two principal exponents of our day.

While Klint in the choice and treatment of his material built on the experience of construction, strength, and hard-wearing properties gained over the centuries, with the aim of developing serviceable furniture that would most directly meet functional requirements, Finn Juhl endeavours, in a formal association with modern free art, to endow his products with an individual artistic quality which is not closely identified with utilitarian form but is remarkable for sculptural character. He models wood to the limits of its capabilities and opposes tense curves in an animated balance.

If Klint strove for anonymity, Juhl seeks personality. Where Klint sought to dispense the timelessly universal in world culture, Juhl cultivates the international aspects of contemporary life. Where Klint, in a long life of continuous repetition of models, refined his furniture into types, Juhl's talent sparkles in sudden flashes of bold and graceful design which requires for its purpose the noblest of woods, and which therefore can never be every man's possession.

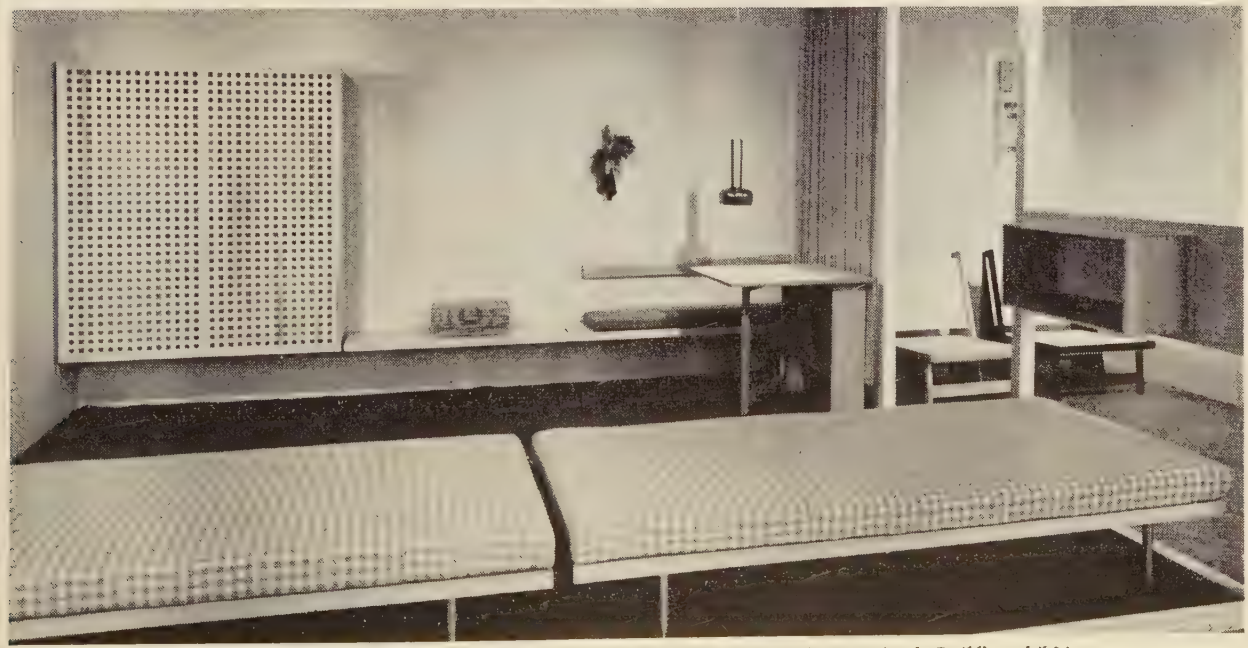
Dining group for a small house, designed by Arne Jacobsen. The chair — with moulded plywood seat and legs of laminated wood — is a prototype of the anonymous utility article, "... simple and clear inexpensive and strong, elegant and popular ..."

Finn Juhl's furniture, with its dynamic form, is incompatible with serial production, and furniture intended for a larger public—if it is to seem at home in any dwelling—must be, if not self-effacing, at least restrained. Finn Juhl is a case apart: his products are for the few.

It remains to be said that the furniture industry on which cabinet-making has had so great an influence must be regarded—at least by the foreigner—rather as "rationally organized, specialized craftsmanship". It is only very recently that a viable large-scale production has arisen, affording possibilities for adequate investment in machinery which makes a complete break with methods of construction derived from cabinet-making. Not only has the absolute rule of wood been broken through the increasing use of other materials such as steel, glass, and plastic, but owing to industrial methods of treatment wood itself has become a new material, a different substance. By means of plywood cutting, steam bending, and various pressing techniques wood has become plastic.

Under these conditions types of furniture are being created in Denmark now that are completely independent even of the contemporary tradition which has been the main theme of this article.

A new trend of development has been initiated.



Furniture for a motel-room, designed by Hanne and Torben Valeur. The cabinet-makers' Guild's exhibition, 1957

SIDELIGHTS ON DENMARK

Coming-of-age Licence

Prince Ingolf, eldest son of King Frederik's brother, Prince Knud, celebrated recently his eighteenth birthday, and being mechanically minded he marked the occasion by passing his driving test, under the chief chauffeur of the late King Christian X.

For Good Comradeship

The lieutenant's association of the First Danish Regiment, on the occasion of a recent jubilee, awarded two grants to private soldiers who, without being paragons of virtue, had displayed exceptionally good comradeship. One of the recipients will spend the money on drawing materials for further education, and the other, who is a married man, will use it as the initial capital of a "baby fund".

Paper in place of Firewood

Increased felling of softwood plantations in West Jutland has given rise to the idea of a cellulose factory at Ringkøbing. A contributory factor is the declining consumption of softwood as more country households go in for cylinder gas, and as paper board and corrugated cardboard are used for packing cases. The supplementing of wood with straw as the raw material in cellulose manufacture is also projected, and it is planned to build a new straw cellulose factory. Denmark already has one such factory, which uses only 20,000 tons of the 5,2000,000 tons harvested anually.

Exporting Cereals

For the first time in many years Denmark has had a surplus of cereals, due partly to compulsory milling of domestic grain, and partly to an increasing foreign demand for Danish malt barley (in West Germany, Belgium, Soviet Russia).

A Million a Day Each

Exporters of Danish canned meat and fresh fish succeeded in disposing of one million kroner's worth of each daily in 1957. The United States is the principal market for canned meat, and the U. K. the chief importer of Danish fish.

Royal Cooking Feast

King Frederik's winter holiday (at the royal family's hunting lodge at Trend, North Jutland) was a male occasion. The cooking was done in turn by the King, his guest and adjutant, and the King's chamberlain and chauffeur.

European Road Three

The new arterial road which will link Lisbon with Stockholm will be a tourist trump for Jutland. The route will run from Hamburg via the Kruså frontier station, Århus, and Ålborg to Frederikshavn, where motorists will be ferried across to Sweden and Norway.

Life Guard's Tricentenary

On June 30 this year the Royal Danish Life Guard will celebrate its tricentenary. The Life Guard is familiar to every Danish child and all tourists, as a detachment of the Guard marches daily from the barracks to the palace, where the changing of the guard takes place at noon. On special days the guardsmen wear red gala uniform, and the colourful everyday uniform includes a black bearskin (for which the Danish embassy in Ottawa has just procured new skin of Canadian bear).

While the guard is celebrating, naval bluejackets will mount guard at the royal palaces.

Fanfare on a glass-trumpet — another opened King Frederik's recent visit to the glass works of Holmegaard (South Zealand) →

A New Naval Museum

The unique collection of model ships belonging to the Danish Navy, the oldest of which are 300 years old, has been installed in a provisional Naval Museum in the Copenhagen church of Skt. Nikolaj (St. Nicholas), formerly a sailors' church and until recently a public library.

In Handbags and Shopping Nets

The currently low prices of butter, sugar, and margarine in Denmark have been so tempting to housewives in neighbouring Sweden that large numbers of them have been making shopping excursions across the Sound. It is estimated that in one day recently 8-10 tons of butter was exported this way—in shopping-bag portions.

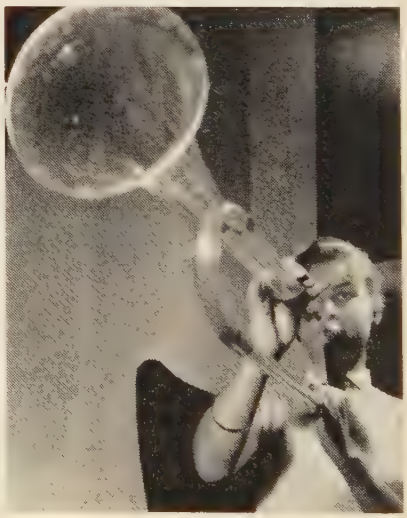
A few years ago it was the Danish housewives who shopped in Sweden, chiefly for almonds, overseas fruit, and delicacies.

Glass Orchestra

Kastrup is internationally known as the name of Copenhagen airport. But the suburb also has a glass works with a remarkable staff band: the instruments are all of glass!

It was started by a glassblower, Hugo Møller (now dead), who made some glass trumpets for the spectators at a football match against another firm. They sounded so well that he went on and made cornets, alt-horns, trombones, and a tuba, using 35 feet of glass tubes of various dimensions. He broke the tuba while working on it and with immense patience began all over again, and eventually the band was able to give its first concert.

The glass instruments have no valves but can play simple tunes, having the same register as a bugle. Møller personally conducted the band, and since his death the instruments have been regarded as irreplaceable and are protected like crown jewels. The glass orchestra, which is now conducted by another musical glassblower, Mr. Kaj Olsen, has successfully appeared in television. ↓



The neat Braille typewriter in use

BARROW INTO CAR

By Kristen Hesselager

Half of all the blind persons in Denmark have exchanged their board and pin for a Danish Braille typewriter, which is a remarkably efficient and inexpensive machine. Given reasonable practice, it can be operated at the speed of normal writing with pen and ink

Children in Danish schools for the blind are taught the use of a special typewriter for Braille, the embossed type which blind persons can read with their fingers. Beginning in their second year, they use it throughout their school period for composition and arithmetic. At the same time they learn the old-fashioned method of writing Braille with a board and pin.

In order to communicate with seeing persons, they also learn to type on an ordinary machine. But the Braille typewriter is an invaluable help, as it can be to adults who are blind if they have much writing to do. It is estimated that about half of the two thousand blind persons in Denmark own a Braille typewriter.

The machine used is of all-Danish manufacture. Denmark does not export other typewriters, and yet a comparatively small firm (Andersson and Sørensen) have perfected a Braille machine which users say is the best and cheapest in the world.

It Began with a Repair

The beginnings go back twenty years. One day the principal of a Copenhagen institute for the blind called at an engineering shop with a Braille typewriter no one else could repair. The firm in question—specialists in the making of delicate scientific gauges—were more successful; and when the principal complained of the machine's shortcomings, the manufacturer undertook to produce a better one.

The machine which his firm designed was so successful that it went into production at once. Following various improvements, it is now exported to all parts of the world, including many leading industrial countries. A new model incorporating further improvements is just going into serial production.

As Fast as Ordinary Machine

The Braille system which this machine employs is completely international. It is based on a set of variations in the arrangement of six dots in a square. The Braille typewriter has six keys, one for each dot; and the procedure when typing a letter or sign is to press at the same time all the keys which give the required character, so producing the complete letter or sign at one touch.

Given reasonable practice, the machine can be operated at the speed of normal writing with pen and ink. Practised operators can attain the speed of an ordinary typewriter, and a well-trained person can do 150 letters a minute. Since Braille uses many abbreviations, the same number of letters in fact gives far more text than ordinary script.

For One or Two Hands

Two models are made, one for two hands and another for one hand. Some persons prefer the latter, as they are able to check their typing with their free hand as they go along. The two-handed machine is more useful to seeing persons.

The design of these machines pays particular attention to two points. They are made as sturdy as possible so as to withstand rough usage; and they are fully enclosed and have large and rounded keys to protect the blind user. The fact that Braille paper gives off more dust than ordinary paper has also been taken into account.

For Musical Notation

The principal purchasers of these machines are institutions and associations for the blind. One of the chief reasons why the price is so low is that there are no middlemen.

The use of Braille typewriters in the care of the blind is making headway all over the world, and the Danish firm has supplied them to many countries through UNESCO. A Braille typewriter can indeed revolutionize a blind person's life. Useful for typing ordinary texts, it is excellent for keeping accounts and it can also be used for musical notation, as the same signs are employed with different meanings.

The board and pin may be adequate for taking notes, but in work of any length they are a great waste of time. As a leading Danish welfare worker has said, there is the same difference between pin and typewriter as between wheelbarrow and car.

COSY LITTLE MUSEUMS

Drawings by MOGENS FØNSS

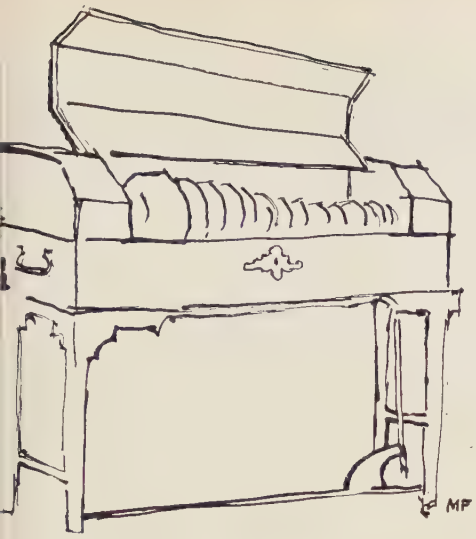
The charm of Copenhagen as a museum city has other reasons besides its many great collections of international renown, such as the National Museum, the Arms Museum, and the Glyptothek. There are also a number of small and little known museums. Each of these contains unique rarities within its special field, and their often rather modest scope gives to each an intimate grace and an atmosphere of good old-fashioned Danish cosiness

↑ In Amager outside Copenhagen the old idyllic Dutch Farm from the sixteenth century has been fitted with a series of fine historical interiors and souvenirs of the Dutch families who were called in during the reign of Christian the Second, bringing with them a high horticultural skill and many characteristic customs

→In the fine old Naval Hospital ("Søkvæsthuset") on the Christianshavn Canal there is a Light and Beacons Museum, which by its comprehensive collection of old lighthouse lamps, lenses, mirrors, rotating devices, and models gives an interesting and amusing picture of the development of the Danish lights and beacons system from the first establishment of tilting-beam lights in 1561 down to the present day

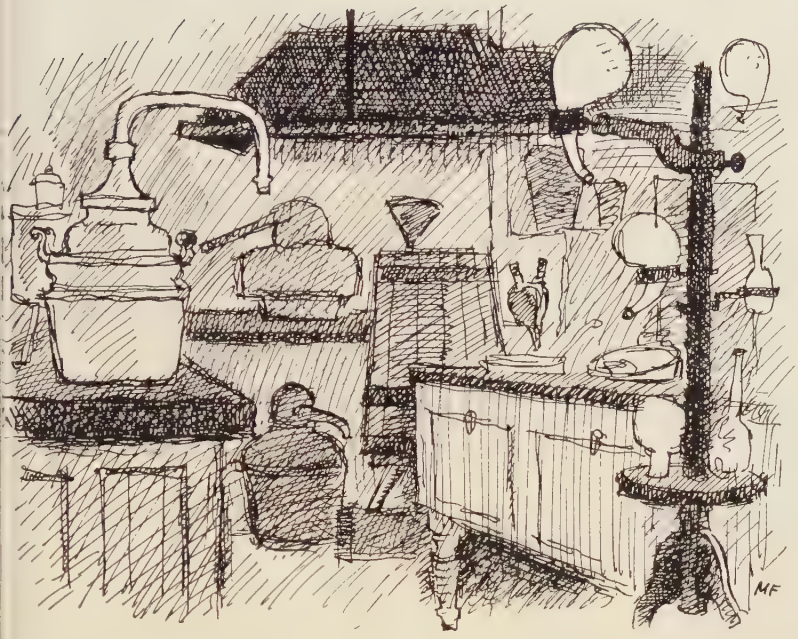
↓ The Fisheries Museum owns a rare collection of original old fishing implements and tackle. The large collection of models of fishing vessels affords an instructive picture of the development of Danish fishing from the fourteenth century onward

↑ The quaint upholstered railway-compartment seat with luggage net above it comes from a parlour car from 1870 for "single ladies on long journeys", and may be seen at the Railway Museum, where the technically minded visitor can also view fine models of Denmark's big bridges across the Little Belt and Storstrømmen, as well as models of the ferries and the rolling stock



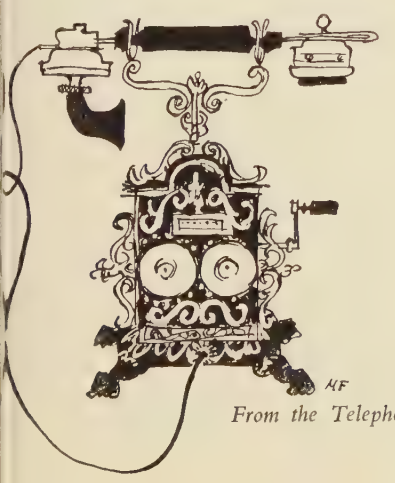
Among the numerous achievements of Benjamin Franklin, the American statesman and physicist, was the invention of musical glasses, one of the most popular instruments of the eighteenth century. A very fine specimen is to be seen in the Carl Claudius collection devoted to the history of music. It is a small select museum which is known to experts all over the world, and which includes about 800 rare and immensely valuable instruments

↑ The old Court Theatre which dates from 1767 is now a museum of the history of the Danish stage. In the memorial room to August Bournonville (1805–79), the father of the Danish ballet, his writing desk, ink stand, bust, and other souvenirs are kept. The violin on the wall was used by Bournonville in dancing lessons at the Royal Theatre

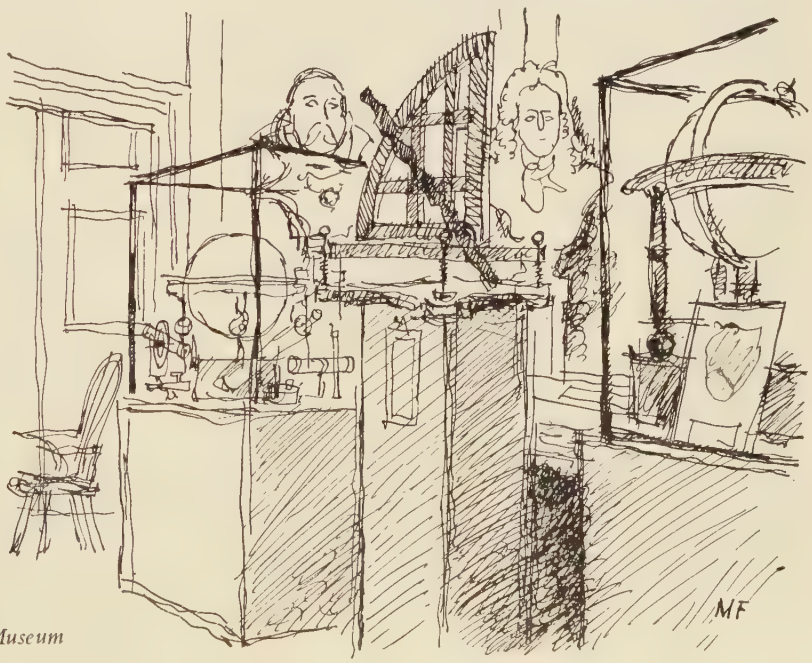


↑ The old pharmacist's cellar with original retorts, glass flasks, copper boilers, and distilling apparatus from way back in the fifteenth century is only one of the many interesting interiors in the Museum of Medicinal History, which contains numerous curiosities and rarities illustrating the history of medical science, dental science, and pharmacy

↓ In 1642 the Danish king, Christian the Fourth, built the striking "Rundetårn" (Round Tower) as an observatory. It is still used for its original purpose, and so has the distinction of being one of the oldest observatories in the world. In the tower a small museum is devoted to Tycho Brahe and Ole Rømer, Denmark's two famous astronomers, whose busts survey the interesting collection of instruments



From the Telephone Museum



The hands of the organist on the keyboard of the Compenius organ. The stops are of solid silver, in the form of Diana's, men's, and lions' heads

A Jewel among Organs

By Hans Carl Nielsen

One of the precious instruments of musical history, the 350-year-old Compenius organ, is still used in the Palace Chapel at Frederiksborg, north of Copenhagen, in a setting rich in national historical associations. Master players come from far and near in order to play this organ. The high reputation of modern Danish organ-builders cannot be wholly unconnected with the inspiration of Compenius

"This is where earthly music leaves off and we hear the music of heaven!" a blind organist professor once exclaimed when a celebrated visitor ran his fingers over the keyboard of the venerable Compenius organ, filling with harmony the splendid interior of Frederiksborg Palace Chapel.... Another master who has played this famous instrument is Dr. Albert Schweitzer; and others have included Leopold Stokowski, Rafael Kubelik, Straube, Heitman, Ramin, and Sir Henry Wood.

The name chiefly associated with this 350-year-old instrument during the last generation has been that of Jens Laumann, the palace organist, who pays tribute to the unique creation to which he has dedicated his life in a recently published book entitled *Compeniusorgelet i Frederiksborg Slotskirke* (The Compenius Organ in Frederiksborg Palace Chapel). Some of the information below has been extracted from this book.

Esaias Compenius, the scion of a German dynasty of organ-builders in the Middle Ages, was born in 1560, probably at Eisleben. He built the organ during the years 1605—10 at Magdeburg, for Count Heinrich Julius von Braunschweig—Lüneburg, who presented it to his brother-in-law, King Christian IV of Denmark. It arrived in Denmark on April 10, 1617, and Compenius came to Frederiksborg Palace with it in order to supervise its installation. He died while there and was buried at Hillerød, the town in which the palace is situated. His name was to live on in the work that he created.

The organ which he built is a work of art to look at. The oak case is richly decorated at the sides and the magnificiently ornamented Renaissance front is inlaid with a variety of woods. The principal decorative feature of the front on the inside is a draped canopy with the male and female figures so popular during the Renaissance, surmounted by foliage and clusters of grapes. The organ has 1,001 square pipes, all of wood. Not all are of oak; some are of such rare woods in organ-building as sycamore, plum, box, ash, ebony, and Thuringian juniper.

Many of the pipes are made from two kinds of wood. Their survival for 350 years shows that the art of wood-preserving was known in those days; great use was made of glue, and yet it has suffered little from the ravages of time. The material used was probably Roman glue, of which the chief constituent is sour milk.

The Craftsman's Joke

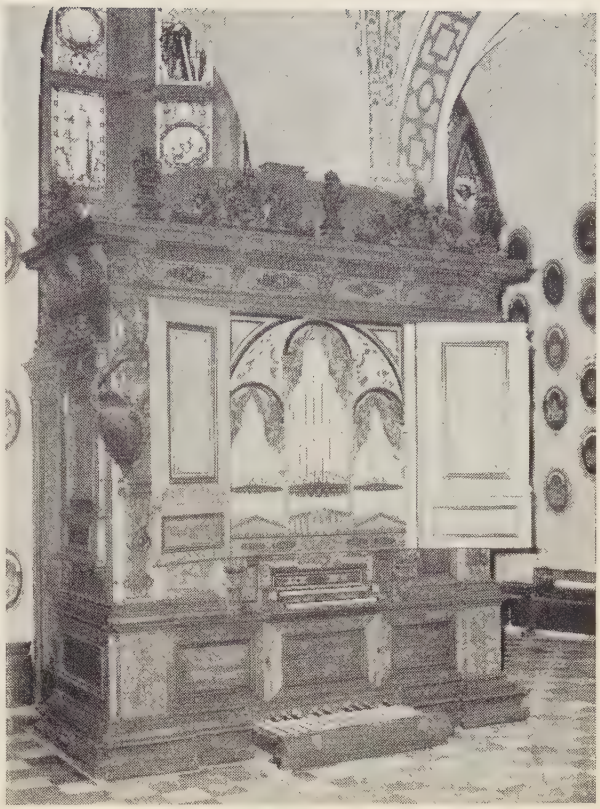
The stops, which are of solid silver, are artistically designed. Nine Diana heads control the great organ, nine men's heads the pedal, and nine lions' heads the solo. The two manuals each have 45 keys, the lower keys being of thick ivory ornamented on the front with chased silver plates, the upper keys of ebony. The 23 pedal keys are of the same materials. The register for the lower C (which runs without a key being touched) is an owl, that for the tremulant a rose with one of the Diana heads, while six independent pipes (c2, a1, f, c1, c, and F) are controlled by a fool's head—possibly a joke on the part of the builder, says Mr. Laumann. The bellows are enclosed in a special compartment behind the organ case. The original four Falten bellows are still in use, and provide a blast of 55 mm.

A detailed consideration of the musical qualities of the organ is outside the scope of this article, but a few characteristic features may be noted. Of the nine stops of the great organ the four-foot Gemshorn, of plum-wood, is outstanding in beauty of tone, being so fine and delicate that one hardly dares to touch it for fear of making a noise! Though soft, it is so full that it penetrates to the remotest corners of this large church. The eight-foot Quintaton of the solo, which is of nine stops, has a mystical chime with a slightly "veiled" quality stirring in its effect: singing, urgent, but not intrusive. The quarter-foot Zimbel is one of the most remarkable musical features of the organ. Almost bell-like in tone, it repeats twice in each octave, and the ear can have difficulty in detecting the top notes. In the pedal, also with nine stops, the four-foot Querflöte is remarkable for several reasons. It is actually eight foot long, but has an over-blow hole in the middle which stops the note from breaking into the octave. The pipe is exceptionally orchestral in quality, and in the tremulant the illusion of a player blowing a flute is complete. It is doubtful whether there is an organ anywhere with a softer tone. When the tremulant is applied to the Päurlin—the reed pipe—the effect produced is so astonishing that every connoisseur of organs has marvelled at it.

Unequal Temperament

The short octave—minus C sharp, D sharp, F sharp, and G sharp—was customary in the time of Compenius, the music of those days having little need of more notes; the part scored for the pedal-board was often more or less a "resting" part. Hence it is necessary now to be selective in the choice of compositions for playing on the Compenius organ.

Careful tuning is also necessary. The Compenius organ is tuned as it was tuned to begin with, and not as we tune keyboard instruments today. The system employed is known as unequal temperament (or mean-tone temperament). In other words, it is tuned essentially true, which means, paradoxically, that many chords appear very untrue because—in popular terms—there are more vibrations than are required to produce the scale now generally employed. A keyboard instrument tuned regardless of "excess vibration" will give trouble in keys with a fair



The beautiful Compenius organ in Frederiksborg Palace Chapel – 3.62 m high, 2.88 m wide, 1.5 m deep. The organ is still used at all services and for recitals at the annual Music and Ballet Festival

Modern organ-building: soldering the foot of a copper bass two metres (over six feet) in length

number of signatures. Nowadays we employ the system developed in experiments made from the end of the seventeenth century onwards, in which the excess is distributed, some of the notes, for the sake of purity, being given too many vibrations, others too few. This, the system of equal temperament, is not used in the Compenius organ. Here the number of available keys is very limited. Good ones are C major, G major, D major, F major, and B flat major, as well as A minor, D minor, and G minor. Less good are E major, B, F sharp major, A flat major, D flat major, G flat major, C sharp minor, G sharp minor, D sharp minor, F minor, B minor, C minor, E flat minor, and F sharp minor. The triad C—E flat—G is, however, passable. But E flat (*i.e.*, D sharp) is quite useless in the triad B—D sharp—F sharp. This, among other things, proves that E flat and D sharp are not the same note, an impression usually gained from playing on tempered instruments! Of the tuning it may finally be said that it is a good half-note higher than concert pitch and about the same as the old choir pitch.

Boom in Organ-building

If new systems have come forward, it is still possible to gain fresh inspiration from the old master. For one thing, modern organ-builders endeavour to construct their principals to the measurements used by Compenius. The organ-builder of today avoids the serious offences committed in the recent past, especially in the late nineteenth century. Compenius marked the culminating point in the development of organ construction which began around the fourteenth century. The decline in quality which followed lasted for nearly 300 years and reached its lowest point in the period 1880–1920. Now this has been left behind and once more the trend is towards quality in appearance, wear, and tone. The prevailing pipe material today is metal, in the form of lead and tin alloys, various woods, including citrus, being used for keys and decoration. Owing to the errors referred to, Danish organ-builders are kept very busy; many of the organs made in the decadent period are worn out and are having to be renewed.

In recent years, Danish workshops have supplied organs to various countries. For example, the church of St. Nicholas at Utrecht has taken delivery of a large organ with 33 stops, a product of the firm of Marcussen and Son at Aabenraa. The same firm built the Sweelinck organ for Hilversum Radio, and are constructing an organ similar in size for the Grote Kerk in Rotterdam. Many Scandinavian churches have had organs built for them at Aabenraa, or by the Frederiksborg Organ-builders and Th. Frobenius and Company of Lyngby. The organ in Lund Cathedral, which with its 101 stops is the largest in Sweden, was made in Denmark. So also were the organs in the concert hall at Gothenburg and the cathedrals at Karlstad, Uppsala, and Stavanger. Another for Bergen Cathedral is under construction. The organ in Skänninge Church in Sweden, where an American company is now recording all the works of Bach and Buxtehude, was also made at Aabenraa.

Inside Denmark

Reginald Spink: The Land and People of Denmark. Adam and Charles Black, London. 87 pp. With four colour plates, 11 photographs, and a map. 7s 6d.

So intimate a knowledge of the popular life and even remote parts of the country is acquired by few foreigners, even when they have, like the author of this book, spent years in Denmark. It is plain to see that he liked it.

"The chief attraction of Denmark, it has been said, is the Danes," he says, extolling their hospitality, in particular to British visitors, a knowledge of English being fairly general. The author likes the humour of the Danes, and refers to their (quite unextravagant) patriotism as well as their habit of hard work, things which in a small country are essential if it is to succeed in an international society.

One of the most amusing parts of this book is the chapter entitled "Food and Customs", which neatly hits off customs good and less good. By Anglo-American standards, the Danes use an inordinate number of set phrases expressing thanks. Guests at a party will say "Thank you for the invitation" and "Thank you for this evening" when they leave. They may telephone the next day to say "Thank you for last evening", and yet will often say "Thank you for the last time" when they next meet their hostess. Large family gatherings are held to celebrate silver weddings, confirmation, etc., when numerous speeches will be made and specially composed songs will be sung for the person or persons being celebrated. The Danes, the author thinks, are "masters" in the art of holding a party.

BOOK SHELF

Often it is discourteous to omit titles, though even Danes find a little foolish the habit, mentioned by the author, of addressing letters to "Mr. old-age pensioner So-and-so", "Housemaid Miss So-and-so", etc.

Beginning with a general account of the country, the people, and Danish history, the book proceeds to more detailed descriptions of geographical areas and the lives and occupations of the people, all clearly and entertainingly conveyed. Greenland and the Faroe Islands have a separate chapter each.

The author seems to have a special liking for Funen, about which he quotes Hans Andersen's tale "Father Always Does What's Right", both in its original form and in the revised version by Johannes V. Jensen (Nobel Prize winner for literature in 1944), which tells how the story might have taken place among the more earthbound and businesslike Jutlanders, following the same course in reverse order. A passage very characteristic of this island is quoted from the memoirs of the composer Carl Nielsen, a native of Funen, which evokes a beautiful summer's day with the smell of lilac and the humming of the bees.

The colour plates in the book might have been better chosen, and one wonders whether reproductions of works by Danish painters could not have been used instead. Perhaps price was a consideration here, the book being intended primarily for younger readers. Incidentally, it is dedicated *To Karen* (the eleven-year-old daughter of the author and his Danish-born wife).

The book has an appendix giving all the general facts, admirably assembled in this way so as not to interfere with the discursive tone of the book, and practical because it saves having to turn them up in the text.

There is both humour and appreciation of the subject in this book. All who wish to make the acquaintance of the land and people of Denmark will read it with much enjoyment and a good deal of profit. *KSkr.*

Manuscript on Muscle Anatomy

On the occasion of a recent anniversary at the Niels Steensen Hospital in the Copenhagen suburb of Gentofte, the Royal Library was presented with a 100-page manuscript dating from 1666, by the Danish scientist and physician Niels Steensen (Nicolaus Steno). The work, which deals with the anatomy of muscles, and is dedicated to Ferdinand II, Duke of Tuscany, was put up for sale by an American antiquarian bookseller. The strong-room of the Geneva bank where the precious manuscript was stored was kept under continuous armed guard.

Best-designed Book

Danish: An Elementary Grammar and Reader, by Elias Bredsdorff (reviewed in DFOJ, No. 22), was among the 100 best-designed books chosen to represent British publishing at the Sixth International Book Design Exhibition, held by the National Book League in London in the autumn. The publishers are the Cambridge University Press.

Half of the Bornholm coast consists of rocks, one of the most remarkable formations being the Lions' Heads - though they resemble camels' heads

Pearl of the Baltic

By Hans Hjorth

Ups and downs, together with unswerving loyalty to Denmark down the centuries, have characterized the island of Bornholm. The mild climate gives it an individuality that is paralleled by the character of its people and scenery. Occupations are picturesque also, with stoneware and herring smoking outstanding among them

A long way from the nearest Danish coast and near enough to the southeast corner of Sweden for it to be in sight, lies the solitary island of Bornholm, at the deepest point in the Baltic. Not only in its situation does it differ from the rest of Denmark, but also in its geology, history, popular speech, and in part its occupations. In sentiment, however, the Bornholmer is as wholeheartedly Danish as any of his fellow-countrymen.

It is a small, compact island, shaped like a rhomboid, with an area of 227 square miles (587 sq. km.). The greatest distance across is 25 miles (40 km.).

The island and county of Bornholm has a population of about 50,000, nearly a fourth of whom live in Rønne, the largest town. Habitation otherwise is scattered, there being no real villages as in the rest of Denmark.

Artists' Playground

The island is of granite formation, with rugged coasts to the west and north. The geology of the south coast is more recent, consisting of sandstone, slate, clay and carboniferous formations, chalk, etc. The most recent of the Mesozoic formations is the local Arnager limestone; and as this is about as old as the deepest limestone deposits in the rest of Denmark, it follows that Bornholm existed before the foundations of the rest of the country were laid.

The climate is mild. Late summer often continues into October. Grapes, mulberries, and figs will ripen in the open.

The scenery is very richly varied. Rocky headlands, patches of heath, and extensive dunes alternate with lush fields and delightful woods and copses. The interplay of land and sea gives very beautiful scenic effects. Since Bornholm is also the driest part of Denmark, and the lighting—for some unknown reason—imparts its own tints to the landscape, it is not remarkable that the island is popular with holiday-makers and artists, who delight in the tranquillity, beauty, and individuality of Denmark's eastern outpost. The "Bornholm painters" form a special group in the history of Danish art.

Bornholm is a paradise for geologists, botanists, and ornithologists. The undulating ground is well stocked with game, and the Danish King traditionally goes shooting once a year in the State forest of Almindingen, which has an area of over 6,000 acres (2,500 hectares).

People and Culture

The population is pure Danish except for an insignificant Swedish strain due to immigration from neighbouring Scania, once a Danish province. There is no evidence of any Baltic, German, or Semitic immigration. The local dialect has the character of the old eastern Danish dialect, which differs from the western Danish spoken elsewhere.

Two of the mail and passenger vessels from Copenhagen in the harbour at Rønne

The hardest of granite is no match for the fertility of Bornholm

Peculiarities of dress, habit, and custom are becoming obliterated in this levelling age, though attempts are made to maintain old traditions.

Intellectually, the Bornholmer must stand high, for many pioneers of Danish intellectual life—scientists and artists—have been of Bornholm extraction.

There are no millionaires here, and no poverty; and, as in the rest of Denmark, the sick and the aged are well cared for. Farmers sow and harvest, fishermen cast their nets in the sea, and the blows of hammers on granite ring out in rivalry with the steady throb of engines.

The principal occupation is a fairly industrialized agriculture, growing seeds, roots, and grain. Cattle breeding stands high; and tuberculosis in cattle has been abolished, as it has everywhere in Denmark. The principal exports are butter, bacon, ham, and cheese.

The island's maritime situation favours shipping and fishing. Excellent passenger ships maintain daily connections with Copenhagen (taking eight hours); there is a busy traffic of cargo ships; the fishing fleet lands quantities of salmon and cod in the winter and herring in summer. The salmon is a valuable export commodity; and the herring, caught during the night, are cleaned, dried, and smoked in the course of the following day and shipped to Copenhagen the same evening.

Granite and sandstone are extensively quarried as the raw material for road construction, house-building, piers, and monumental use. Polishing gives the granite a handsome black or flamed surface.

The rich deposits of kaolin and clay provide raw material for pottery-making; the excellent fire-bricks and glazed drain-pipes successfully compete with the best in Europe. Smaller factories produce artistic goods of

earthenware and Bornholm stoneware, the best of which enjoy a high reputation abroad.

The Bornholm towns are friendly and tidy places with cottages and pleasant little gardens. The many herring smoke-houses with their peculiar construction are a distinguishing feature of the landscape. Old-world half-timbered buildings with tarred beams and whitewashed wall surfaces are characteristic of town and country.

Fortress Churches

The fifteen country churches (most of them dating from the twelfth and thirteenth centuries) include four round churches, a form known only in a few places in southern Sweden and Denmark. The vaults are borne by a heavy circular pillar in the centre of the building. The upper storeys indicate that the churches had a defensive purpose, for which there is an historical reason.

The history of Bornholm is a record of ups and downs and changing political possession. According to the earliest historical records, the island was an independent kingdom; it probably came under Danish rule about the year 1000 A.D. In 1080 A.D. Adam of Bremen described it has having Denmark's most widely known harbour, conveniently situated for the great traffic with the Russian rivers. Commercial relations with foreign peoples brought wealth to the island, a fact proved by many grave finds. Its prosperity was a temptation to the Wends, who from their strongholds on the Pomeranian coast raided the island for its corn, cattle, silver, and well-fed women.

As places of refuge the population constructed circular fortresses, traces of which can still be seen. Conditions in the Baltic were unsettled throughout the Middle Ages, and so the heavily built stone churches were also adapted for defence. This applies to some of the rectangular churches as well as the round ones.

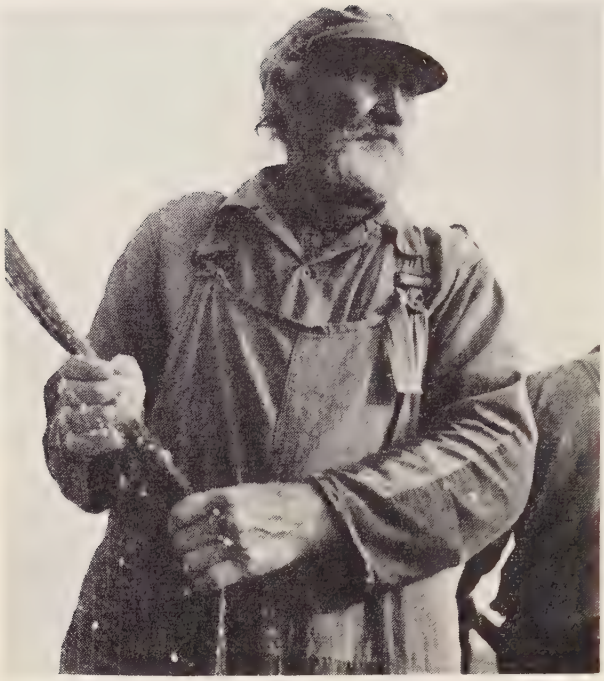
Hard Taskmasters

But others besides sea-rovers had their eye on Bornholm. The Crown and the Scanian bishops struggled for possession of it. The ruins of the bishop's castle of Hammershus and the royal castle of Lilleborg testify to the energy with which they defended and consolidated their power. The outcome of the struggle was that Bornholm passed into the control of the Archbishopric of Lund for 375 years. The population were impoverished by taxation and compulsory labour services.

When the Hanseatic League of northern Germany asserted its power Bornholm gained a share in the enormous revenues of the herring fisheries, and the towns became fairly prosperous. But as they were poorly defended they were a constant prey to attack, plunder, fire, and robbery, which went on for a hundred years. In 1525 the Danish King mortgaged the whole island to the rulers of Lübeck. For fifty years the Lübeck governors behaved there as they liked, and their rule was even harsher than that of their predecessors.

After a brief period of Danish rule Bornholm was captured in 1645 by the Swedes, who controlled it for

Many cutters from outside Bornholm fish in the Baltic for salmon with the island as their operational base. Here a small fleet is locked in the ice



Left: This grand fisherman is a worthy representative of the Bornholm population. Right: It is chiefly the picturesque side of herring-fishing which the visitor sees. After smoking in one of the characteristic smokehouses the herring are hung up to dry on slats of wood arranged on frames

fourteen years. By this time, however, the patience of the Bornholmers was at an end. The Swedish governor, Colonel Printzenskjöld, was killed by conspirators, Hammershus was taken, and the island was handed over to the Danish King, Frederik III. Bornholm has remained under Danish rule ever since. During the Second World War it was occupied, however, by German and later Russian troops. The Russians withdrew in 1946 after eleven months of occupation.

In spite of—perhaps even because of—their vicissitudes, the people of Bornholm are unshakably loyal to Danish rule, and will undoubtedly remain so whatever the future may hold.

No account of Bornholm can close without a reference to Christiansø, the name given to a group of tiny, picturesque islands and rocks which lie ten miles north-east of "land", as Bornholm is called there. They have the same population, geology, history, and language, but they are inhabited by only 150 persons, chiefly fishermen and their families. Vegetation is so sparse that it would scarcely feed a cow. There are no vehicles, no cinemas, no local taxes. Drinking-water is rainwater gathered in a reservoir in the rocks. Local affairs are administered directly by the Government, which owns and lets all houses and other buildings. There is a church, a school, a library, and of course a lighthouse with a fog-horn service. The Government agent is lighthouse-keeper, chief of police, and customs officer. A mail boat brings letters and all supplies from Bornholm. A Government-licensed storekeeper, who also runs a boarding house, deals in everything.

The powder magazine at Frederiksø, seen from the lighthouse on Christiansø (Christian's Island)

In the middle of the seventeenth century the two largest islets in this little group were fortified, and most of the extensive fortifications still remain. Thick walls with loopholes and heavy towers and bastions were built on the bare rock from local granite. Two long rows of houses, forming the only "street", which used to be barracks for several hundred men, are inhabited now by fishermen. They have remained unchanged, and no new buildings spoil the original, picturesque panorama. The sea forms the finest of backgrounds for the yellow-washed houses, the weathered walls, and the rock faces. The whole makes a uniquely romantic setting of old architecture and natural beauty, surviving the destruction of centuries of war and unrest. There is nothing more beautiful this side of the Alps, many people say.

Quality Reflects Method

By K. Henning Pedersen

From cellars and attics in the infancy of radio the Danish radio industry has advanced to modern factories employing 30,000 people. Through a sub-contracting system and consequent specialization the products of the industry have reached a technically outstanding quality in the most diverse lines

Danish handymen with a technical bent sat in their homes, some thirty years ago, tinkering with a wonderful new gadget called a crystal set. Late of an evening they would busy themselves fitting various odds and ends together into a system able to pick up speech and music over the air through the clumsy headphones which then were an indispensable part of listening-in.

This home hobby was to set off a Danish industry which since then has gone a long way. Some of those many amateurs were not content with their early successes. They improved on their first sets, built new ones—and sold the old ones. The keenest of them all went further: they assembled imported parts and began on a large scale to market their products to less enterprising and less technically minded fellow-countrymen. The claim to a place in the home by their wives sent them from the dining-room table into the cellar or the attic. And thus began a radio industry which now employs between 25,000 and 30,000 persons and which last year exported equipment worth over 100 million kroner, chiefly in the form of radio components.

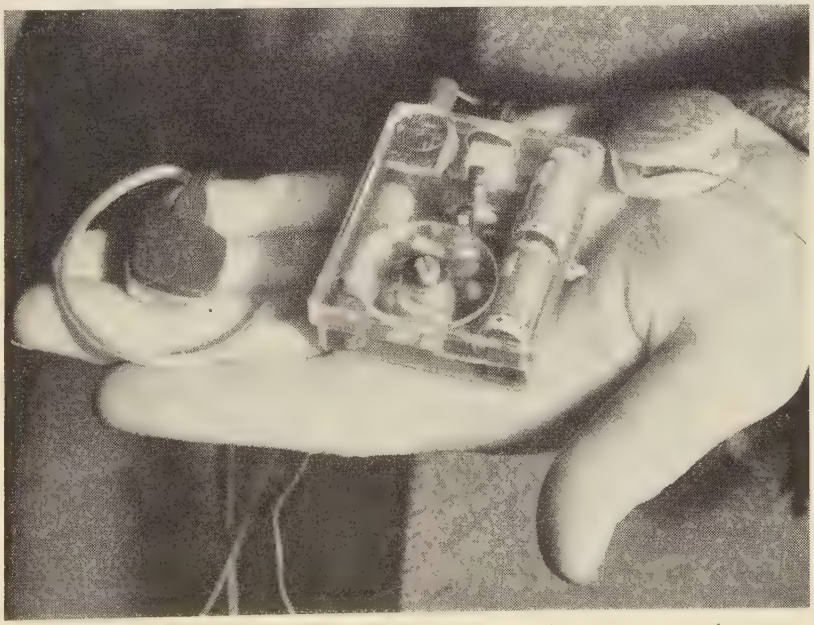
In the first tentative experiments with crystal sets it so happened that an amateur, anxious to proceed rapidly to the primary objective of listening-in, used as a resistance the simple stroke of a pencil. He would draw a bold stroke of graphite and apply a flex to either end, and the graphite line was so poor a conductor that he would get a usable resistance. A few years later, a young man working in a cellar started to make carbon resistors, and it soon occurred to him to cement them into bakelite. Today, the firm produces 125 million resistors a year, of which nearly 90 per cent. are exported to fifty-odd countries. Since the war, the business has become one of the most fully automatic establishments in the country. In price it can compete in any market in the world, and it produces more than all the corresponding German factories put together.

When radio was in its infancy the factories made all their own components. But with increasing development and serial production they found that it did not pay them. The result was a sub-contracting system which, besides rationalizing production, has meant better components, through the specialization of individual branches of the industry. There are a dozen Danish factories making radio and television receivers and transmitters.

Denmark has had full broadcast coverage for many years. To improve reception conditions a series of FM stations giving full coverage has been introduced more recently. The Danish State Radio had warned the industry of the impending new development; and so, in association with the Radio Research Laboratory, it was able to develop frequency modulated receivers in time for use from the day on which the stations were ready to transmit.

Television has made enormous strides in a very short time. The forecasts have been well exceeded and the erection of TV transmitters has had to be speeded up. Consequently Denmark, first among the Scandinavian countries, is virtually covered; with the good result for the industry that other Scandinavian countries are buying Danish TV sets.

Collaboration with Government authorities has established the right basis for a domestic market, which for any industry is the foundation of the export trade. Out of this domestic market have grown up many component factories; small establishments employing 50–100 persons which, by reason of their well-organized production of technically high quality, can market their products in many parts of the world. This is true, for example, of Danish transformers with cores of magnetically directional material, and of output transformers with directional laminae. The former mean much smaller dimensions than the ones formerly used



Radio sets no bigger than a packet of cigarettes can now be made, owing, among other reasons, to transistors. But these midget sets are still only a curiosity not included in normal production

☆

Super Snow Clearer

Inspired by last winter's weather, which brought the largest falls of snow for many years, a Danish engineering firm is making a snow-clearer which can shift two tons in two minutes. It cuts the snow with spiral screws and a blower then flings it a distance of up to a hundred feet. The tractor which pushes the snow-clearer has twelve gears, one having a speed corresponding to 360 feet an hour, or six feet a minute. Someone has worked out that last winter cost as much as 2000 houses.

Powder and Steel Mills

The idyllic small town of Frederiksværk (North Zealand), which grew up round a powder mill 200 years ago, has completely changed character in the last twenty years owing to the erection of a steel mill which produces from scrap over 20 per cent of Denmark's supplies of steel. The mill has reached the limits of its capacity and big extensions have begun.

and so are well adapted to aircraft, radar, etc. Some factories "tropicalize" export goods of this sort, casting them in plastic to make them resistant to humidity, white ants, etc. The output transformers are finding a large market because with their special construction they can reproduce the loudest passages in a piece of music without distortion. They are an important link in the development of high-fidelity equipment.

Division of Labour

In the case of these components, requiring as they do a special technique and special skill in those who make them, Danish manufacturers can point to something quite unique. They compete against one another, often keenly; but it may well be that a firm receiving an order for a particular component will refer the inquirer to another firm. Specialization has been carried to its limits, and no firm will go in for products which would require a reorganization of the business, re-training of personnel, and investment in new machinery which might not be fully utilized. The result of this attitude is that component factories, which, like the radio and television receiver makers, work to a sub-contracting system, have arrived at products of such a high technical standard that they can make their way anywhere. Several firms stress the fact that they do not compete in price, only in quality; yet their invoices show orders executed to every continent.

Electronic and Medical Instruments

An important part of the Danish radio industry is the electronics branch, which produces echo-sounders and radar sets. A comparatively new development in this branch is technical television, which will be particularly important in general and technical schools, and which in the atomic age will have a great mission in controlling atomic reactors and meeting the great safety requirements connected with the new source of power. The atomic reactor which has been built at Halden in Norway as a joint experiment for the OEEC countries is equipped with Danish technical TV.

The Danish radio industry has laboured many times, and the result has always, so to speak, been vigorous infants which still belong to the family, though not all may seem directly connected with the radio industry. This is true of delicate gauges used in medicine, X-ray equipment, electrocardiographs for recording the functioning of the heart, and electroencephalographs for making similar measurements of the brain. Products of another kind are dictaphones, tape recorders, film equipment, intercommunication systems, and assembled units for wireless installations.

Juke-boxes, originally an American phenomenon, are found today in every continent. A couple of Danish radio factories have specialized in improving these, which they have done so effectively that juke-boxes marked "Made in Denmark" may now be seen even in America. With the development of intercommunication systems in factories, offices, and schools, one of the industry's first export branches, the loudspeaker factories, have entered upon a new period of prosperity.

A high proportion of the labour force in the radio industry is female. The young woman in the photograph is winding transformers, one of the industry's specialities

Future Tasks

Danish radio factories have over the years supplied equipment to broadcasting stations in other countries. This year, one factory has obtained employment for a full year supplying transmitters for civil aviation in India. At factory laboratories and in the industry's research laboratory work goes on at full pressure in the further development of both radio and electronic equipment. An important factor in the development now taking place is formed by transistors; small amplifying elements of semi-conductor metal which are much smaller and require much less output than electronic valves, are far cheaper, and far sturdier. They will mean a revolution in prices.

By means of a transistor and with the aid of printed wiring it is now possible to make radio sets of match-box size which can be carried in the breast pocket, so that broadcasts may be listened to while walking to and from work. A Danish firm has already made such a mini-radio. But it will be some years before everybody owns one.

Our Ships: Our Pride

Biggest Shipowner Expanding

The Danish Mærsk Line (A. P. Møller), the largest shipping company in Scandinavia, will have in 1958 a total tonnage of over a million tons deadweight. This makes it nearly twice the size of the second-largest owners in Denmark, the East Asiatic Company, and nearly half as big again as the largest Swedish and the largest Norwegian companies. The A. P. Møller company, which is now the tenth largest in the world, was founded half a century ago with one small steamship.

The 81-year-old owner's comment: "Large growth was not the aim; day-to-day work brought it about..."

Painting the Fleet Red

The Danish shipping firm of J. Lauritzen has hitherto painted its special Polar ships (including the famous *Kista Dan*) in red, so they would stand out against the ice and snow.

Following numerous tests with ships' paints (which Denmark specializes in manufacturing), the company has now decided to paint its whole fleet red. The owners calculate that the ships will be so much more visible in fog that one wreck and one collision will be saved every ten years. Also, patches of rust and scratches caused by barges will not be so disfiguring on these distinctive ships.

The company's white refrigerator ships, known as Reefers, will also be painted red. While it is true that red attracts solar heat, this should not matter with modern ventilating systems (of which Denmark is also an experienced producer).

Furniture Design in Ships

Ships have taken longer to abandon heavy furniture than homes ashore, but Danish furniture, in spite of its slender lines, harmonizes well with the robust framework of a cargo ship. A fine example of the current trend is the furniture on board the United Steamship Company's cargo motor vessel *Virginia*, which has just entered the North American service as the first of a series (See the article "Homes at Sea", DFOJ No. 18).

Bold Shipbuilding Projects

Lack of room has long been a problem with the Copenhagen shipyard of Burmeister and Wain (Denmark's largest industrial establishment, employing 8,300 persons). The present slips, all of which are adjacent to the port of Copenhagen, will be occupied for the next three years and so the yard has taken the bold step of filling in 300,000 square metres of the Sound. A 60-metre-high assembly shop is included in the project, which will enable the yard to build ships of 60,000–70,000 tons dw. The first vessel to leave the new slipway will probably be a tanker built for a Belgian company.

Another Danish yard, the Odense shipyard, is expanding on an even greater scale and will soon be able to build ships of up to 100,000 tons on its slips in Odense Fjord. The new staff housing due to this extension will mean the urbanization of a small country parish.

The Danish diesel-driven tractor in field work. The tractor is made in the town of Kalundborg, whose unusual five-spired church is depicted on the Danish five-krone note and 20-øre stamp

New Horsepower for Old

By Victor Andersen

The changeover from horses to tractors since the war has naturally given agricultural Denmark her own tractor production. Of sophisticated simplicity, sturdy construction, and surprising performance, the Danish tractor is now at work under widely different conditions

Visitors to Copenhagen will be familiar with the Tivoli Guard, the company of boys who parade in the famous Tivoli Gardens. The splendid white horse ridden by the captain of the guard had recently to be replaced and there were no longer any available in Denmark. So one had to be bought abroad. The foreign horse has settled down in its new and pleasant environment; and that, it might be thought, is the end of the story.

And yet not quite; for the incident throws an interesting sidelight on a major trend, in Denmark and in other countries: namely, the rapid replacement of the old horsepower by the new petrol- and oil-driven one. There is no mistaking the trend in Denmark:

1944...	Horses 586,000	Tractors 4,000
1953...	426,000	43,000
1957...	254,000	78,000

Many of the horses which once did their steady day's work on Danish farms have been "pensioned off", while others are exported. By early 1957 90 per cent. of the tractors imported had been paid for by the simultaneous export of horses. But during the last few years Denmark has begun, not unnaturally, to make tractors herself; and they are competitive enough to be exported. She is thus an exporter of both the old and the new horsepower.

Cold-, Heat-, Damp-, Shock-proof

The ultra-modern factory which produces these tractors (Bukh of Kalundborg) is principally engaged in making diesel engines for other uses. For example, it has made the engines for most of the lifeboats in Scandinavia. It was the same firm that impressed the fire service in the port of New York by providing a fire-fighting craft capable of starting while nearly submerged, and baling itself out as it went.

The same efficient and reliable engine is now built into tractors, where it has stood up well not only to cold, heat, and humidity, but also to rough usage. A tractor recently collided with a train at a level crossing and was carried for some distance along the track. The driver escaped unhurt and hurried to stop the engine, which functioned undisturbed.

This tractor is diesel-driven, but there is also a rather smaller petrol-driven tractor. The diesel tractor weighs 1600 kg. ($31^1/_2$ cwt.) and has a two-cylinder, four-stroke engine developing 30 hp. A 45 hp. tractor has gone into serial production this year. There are many bigger and more powerful foreign tractors, but the middleweight Danish diesel tractor is perfectly capable of heavyweight jobs. Many astonished customers in farming and forestry have testified to this. How is it, they say, that a 30 or 45 hp. tractor can pull such heavy loads?

More Power with Economy

The answer is that the features which matter in a tractor are not so much horse-power as net weight, weight distribution, wheel sizes, and distribution of traction points. By adjusting these factors a considerable reduction has been achieved in wheel slip and a corresponding increase in tractive power and economy unknown in other makes of the same class.

The design of the Danish diesel tractor also takes into account the fact that a modern tractor is more than just a motorized draught animal: it is an implement which should serve the farmer in many ways. So it is provided with additional features such as adjustable wheels, three-point hydraulic lifting apparatus with automatic stop, differential lock for cogging the rear wheels on slippery surfaces, six speed gears including creep-gear which makes it highly adapted for pulling combines, steering dampers which facilitate sharp turns, all-electric accessories, etc. Yet so simple is the design that any village smith can understand it.

Trials Lead to Better Seat!

Test models were at work in South America, Africa, and northern Scandinavia before serial production began. At the factory, the engine was tested at temperatures of 60° C. (140° F.) and minus 40° C. (minus 40° F.), and was kept submerged for many hours. Its performance under every condition was unexceptionable. As a result, serial production has been possible without appreciable changes in design, and the engine has found satisfied customers in countries so diverse as Brazil, Chile, Tanganyika, Spain, Portugal, Norway, Sweden, and Finland.

In one respect only has there been any important alteration in design. Owing to the many uses to which this smoothly working engine can be put, the driver spends a good deal of his time sitting down. So in the latest model the tractor seat has been made extra comfortable.

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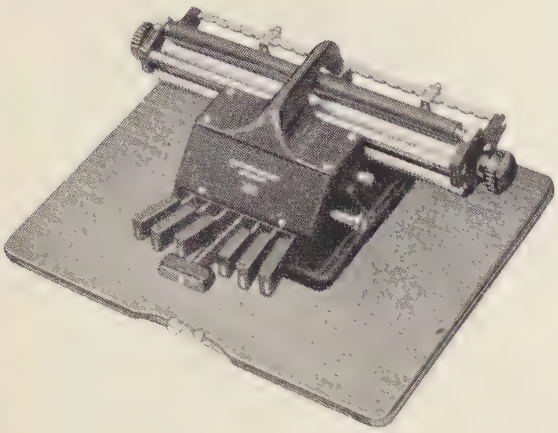

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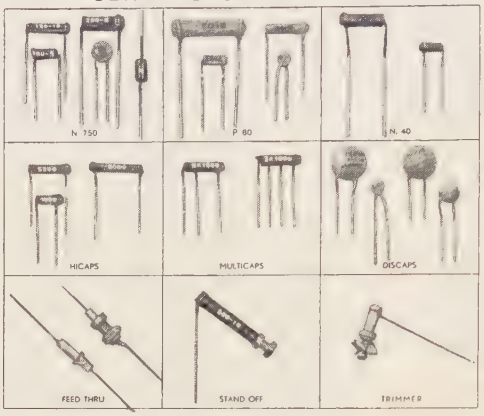

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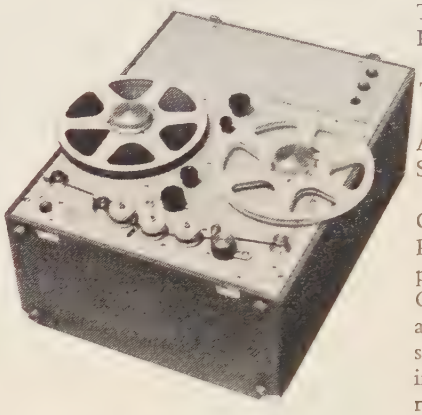

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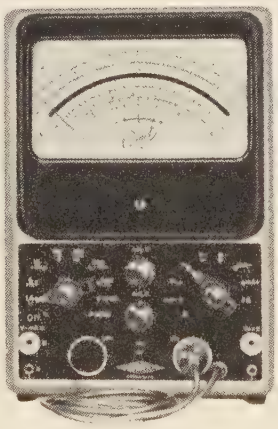

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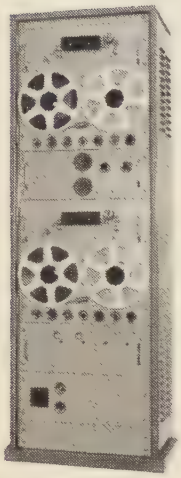

- **tape recorder model A-3**
- **tape player model B-6**
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- **dual-channel recorder model G-2**

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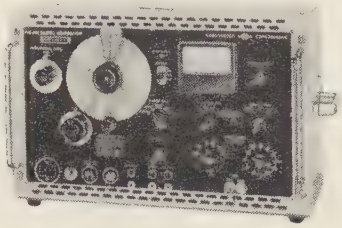
model G-2 : dual-channel for recording in air-ports etc.

FM-AM Standard-Signal Generator, Type MS27



Frequency Range: 0.3 – 240 Mc.
FM: normal: ±5, ±25, and ±75 kc ranges.
High: up to ±600 kc depending on frequency range.
AM: 0 – 80%.
Output Voltage: 0,1 μV – 0,1 V across 50 or 75 Ω.
Crystal Calibration of frequency dial.
Δ f Control: calibrated ±50 kc.

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COMPONENTS for RADIO and TV

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- Valve sockets
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- FM-tuners

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- Deflection yokes
- Focusing units
- Stagger coils
- Peaking coils
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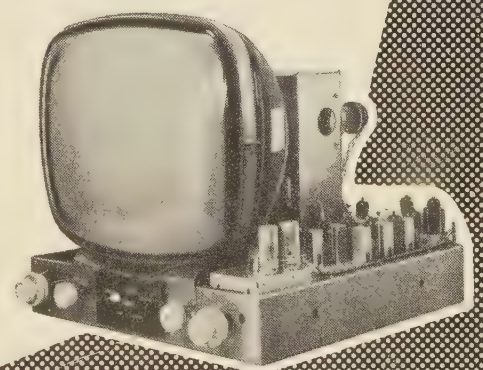
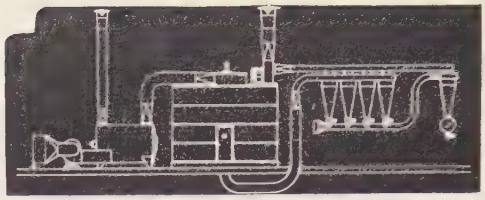
- TV-tuners
- TV-kits



TOROTOR A/S

Manufacturer of Radio- and TV-Articles
6 Kollegievej . Charlottenlund . Denmark
Tel.: Ordrup 5502 . Telegrams: Torotor



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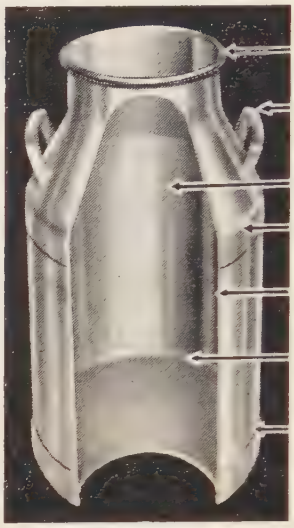

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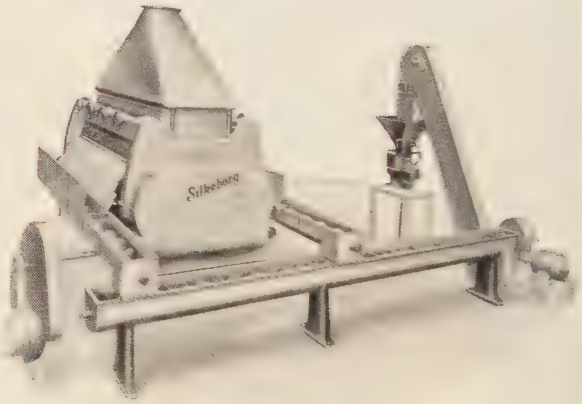

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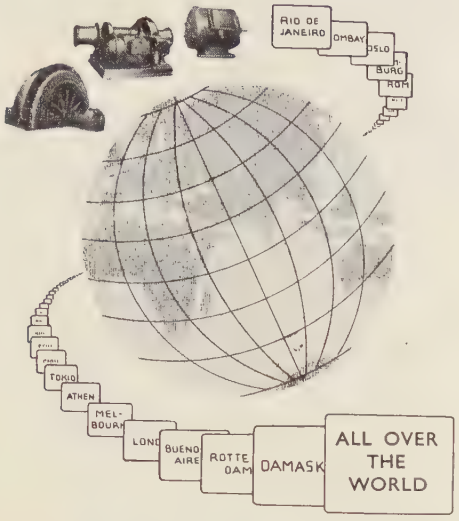

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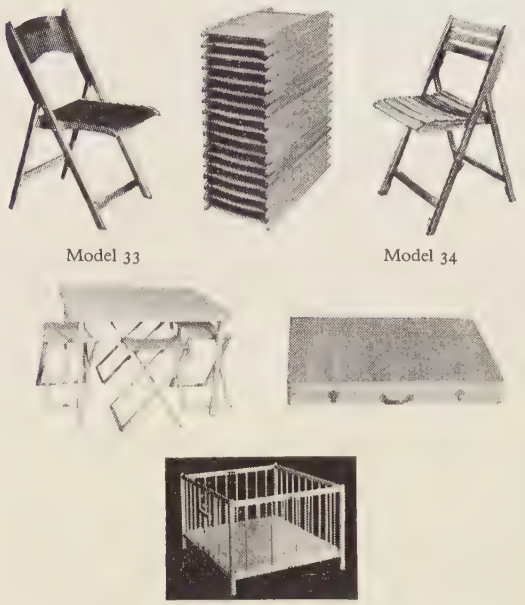

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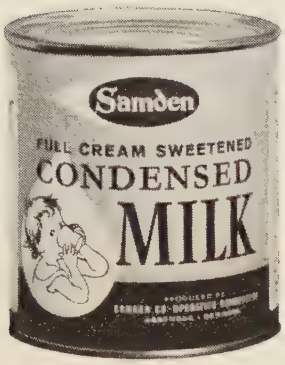

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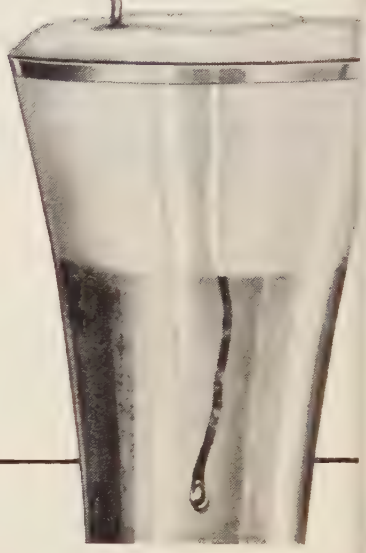

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for taste, appearance, and as an export article.

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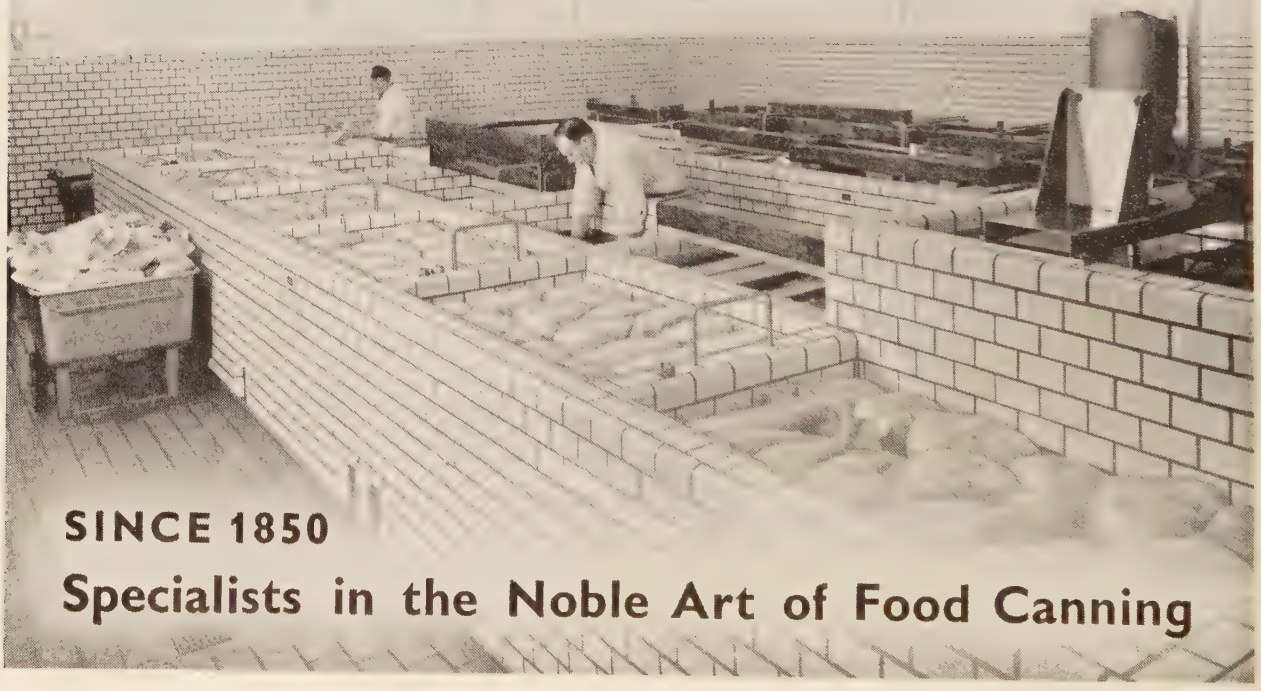

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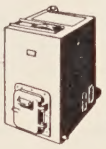

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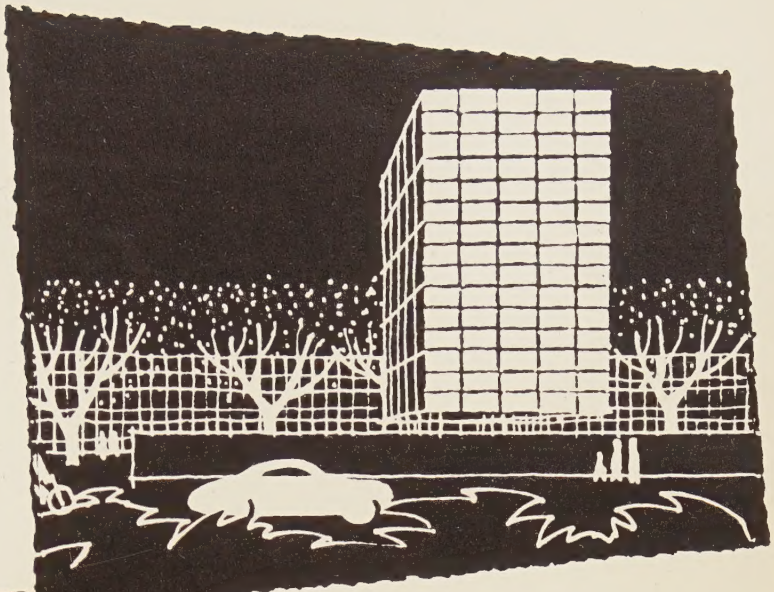

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in the world-famed Danish quality exceeds the requirements of standard specifications of all principal countries.

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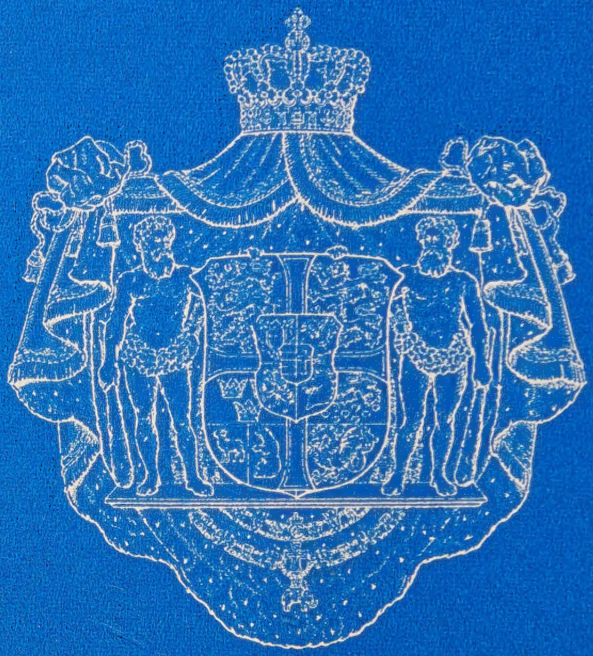
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